Rational choice, preferences over actions and rule-following behavior

Vanberg, Viktor J.

Veröffentlichungsversion / Published Version
Arbeitspapier / working paper

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:
SSG Sozialwissenschaften, USB Köln

Walter Eucken **Institut**

ORDO ➔ Constitutio in Libertate

Rational Choice, Preferences over Actions and Rule-Following Behavior

Viktor J. Vanberg

07/6

Freiburger
Diskussionspapiere
zur Ordnungsökonomik

Freiburg
Discussion Papers
on Constitutional Economics

ISSN 1437-1510

Institut für Allgemeine Wirtschaftsforschung
Abteilung für Wirtschaftspolitik
Albert-Ludwigs Universität Freiburg i. Br.

Rational Choice, Preferences over Actions and Rule-Following Behavior

Viktor J. Vanberg
07/6

Freiburger Diskussionspapiere zur Ordnungsökonomik
Freiburg Discussionpapers on Constitutional Economics
07/6
ISSN 1437-1510

Walter Eucken Institut, Goethestr. 10, D-79100 Freiburg i. Br.
Tel.Nr.: +49 +761 / 79097 0; Fax.Nr.: +49 +761 / 79097 97
http://www.walter-eucken-institut.de

Institut für Allgemeine Wirtschaftsforschung; Abteilung für Wirtschaftspolitik;
Albert-Ludwigs-Universität Freiburg, D-79085 Freiburg i. Br.
Tel.Nr.: +49 +761 / 203 2317; Fax.Nr.: +49 +761 / 203 2322
http://www.vwl.uni-freiburg.de/fakultaet/wipo/

Rational Choice, Preferences over Actions and Rule-Following Behavior

Viktor J. Vanberg

"Man is as much a rule-following
animal as a purpose-seeking one."
F.A. Hayek 1973: 11

1. Introduction

Economists' seemingly unshakable loyalty to rational choice theory is presumably due in no small part to the fact that, in its most general version, it is of considerable intuitive appeal. Its claim that in going about their lives people do what, in the situations they are confronted with, they consider most preferable, in terms of their own standards of evaluation, is not only extremely plausible, but it seems impossible to even think of human action in any other way. How could we make sense of each other's actions if we were not to assume that people behave in ways that, in their own judgment, are preferable to the alternatives that they consider? In fact, it seems outright impossible for us even to imagine someone acting differently from what, among his available options, appears to him preferable.[1]

A theory for which we cannot even imagine contradicting evidence, that is compatible with everything that might conceivably happen, has a drawback, though. It can be of no help whatsoever in explaining real world events. It is irrefutable because it has no empirical content and, hence, no explanatory power (Popper 1980: 119ff.). If rational choice theory is to be able to explain real world phenomena, empirical content must somehow be infused into it in the form of assumptions that go beyond the irrefutable claim that people choose what they prefer, assumptions that rule out events as factually impossible that are conceivable. Implicitly and explicitly economists who wanted to offer more than exercises in pure tautological transformation have always

[1] This observation prompted Ludwig von Mises (1949: 18) to conclude: "Human action is necessarily rational. The term 'rational action' is therefore pleonastic and must be rejected as such."

included such assumptions in their rational choice accounts. The purpose of this paper is to discuss some of the content-enriching strategies employed in economic versions of rational choice theory and their shortcomings, with a particular focus on the role of rule following in human conduct.

2. Rationality Principle and Rationality Hypotheses in Economics

What I have referred to above as the most general form of rational choice theory may be called the *rationality principle* (Vanberg 2004a). It essentially claims that individuals act in ways that are consistent with their beliefs about how the world works and their preferences over the states of the world that they expect to result from the different courses of action available to them. What courses of action individuals perceive as available options, what they believe to result from these options, and which outcome they prefer over all others are all subjective matters, present in a person's mind and not observable from the outside. In the absence of independent evidence, an observer who infers a person's beliefs and preferences from her behavior can 'explain' every conceivable action, including the most absurd, by hypothesizing beliefs and preferences that are consistent with the action. To the extent that action-independent evidence of a person's beliefs and preference is available such 'explanations' may be refutable. Yet, the refutation concerns only the specific assumptions made about the content of a person's beliefs and preferences in the particular instance. The rationality principle itself, i.e. the general claim that people act in subjectively consistent ways, remains totally unaffected by such refutation.

If one wants to turn the rationality principle itself into a refutable conjecture, into an empirically refutable *rationality hypothesis* (Vanberg 2004a), one has to place *general bounds* on the assumptions about people's beliefs and preferences that are admitted in explanations. In other words, one has to rule out – if not the existence, at least the explanatory relevance of – certain kinds of beliefs and preferences. Neoclassical economics has responded to this challenge by modeling humans as maximizers of their utility function,[2] where the latter reflects their preferences and the 'maximizing' is meant

[2] The founding father of the neoclassical paradigm, Léon Walras, noted: "In our theory each trader may be assumed to determine his own utility or want function as he pleases. Once these curves have been

to imply that they act on adequate theories about what are efficient ways to accomplish their goals. While there may still be room for interpretation regarding what 'adequate beliefs' is exactly meant to entail and how utility functions are to be specified, a standard assumption in neoclassical theorizing has been that economic agents act on perfect knowledge of the relevant aspects of their environment, and that their utility function is essentially about the (material) payoffs that they expect for themselves from their actions.

It is this model of *perfectly rational* and *self-interested* behavior[3] that has long since been, and continues to be, the principal target of criticism.[4] From Thorsten Veblen's early biting critique[5] to the more recent critique coming from the behavioral and experimental camps within economics,[6] fundamental doubts have always been voiced about the realism of the view of human behavior that this model embodies. To such critique economists have responded essentially in one of two ways. They have either insisted that its lack of 'realism' does not prevent the maximization model from serving its explanatory purposes quite well. Or they have sought to add realism to their theories by revising the core assumptions of traditional neoclassical theory. In the remainder of this section I shall look at the most prominent example of the first kind of response, namely Milton Friedman's (1953) defense of unrealistic 'as if' assumptions. As an

---

determined, we show how prices result from them under a hypothetical régime of absolutely free competition" (Walras 1954: 256). – Nicholas Georgescu-Roegen (1971: 343) points out that Walras' s successor on the Lausanne chair, Vilfredo Pareto, "overtly claimed, (that) once we have determined the means at the disposal of the individual and obtained 'a photograph' of his tastes … the individual may disappear."

[3] The term 'self-interested behavior' is more appropriate in this context than the often used term 'selfish behavior' because the attribute 'selfish' carries with it certain (negative) connotations that bias the issue. It implies assumptions about *the ways in which* persons go about seeking to 'maximize their utility' that need not be entailed at all in a theory that supposes humans to rationally pursue their self-interest. While a selfish person may indeed be a "rational fool" (Sen 1977), a self-interested person need not be.

[4] For a review of critiques of the rationality assumption see Vanberg 2002; 2004a.

[5] Veblen (1993: 138f.): „The hedonistic conception of man is that of a lightning calculator of pleasures and pains, who oscillates like a homogeneous globule of desire of happiness under the impulse of stimuli that shift him about the area, but leave him intact. … Self-imposed in elemental space, he spins symmetrically about his own spiritual axis until the parallelogram of forces bears down upon him, whereupon he follows the line of the resultant. … Spiritually, the hedonistic man is not a prime mover."

[6] V. Smith (2003: 480) noted in his Nobel lecture: "Psychologists and 'behavioral economists' who study decision behavior almost uniformly report results contrary to rational theory. … (T)he focus on 'anomalies,' beginning in the 1970's, converted the emerging discovery enterprise into a search for contradictions between reports of behavior and the caricatures of mainstream theory that constitute so much of its core." – For references to research findings that "contradict the neoclassical model of rational choice" see e.g. McFadden 1999 and 2005: 12ff..

example of the second kind of response I shall discuss in section 3 arguments that have more recently gained prominence in behavioral and experimental economics.

There are surely few arguments in modern economics that have been more intensely debated than Milton Friedman's claim, put forward in his 1953 essay on "The Methodology of Positive Economics," that unrealistic 'as if' assumptions are legitimate scientific tools as long as they yield workable predictions (Mäki, ed., 2007). I shall concentrate my comments on a few aspects of the issue that are of direct relevance in the present context.

To be noted first is the ambiguity inherent in Friedman's use of the term 'assumption.' If one accepts, as Friedman presumably would have, the argument – made by K.R. Popper (1972: 351) and others – that to provide a scientific explanation means to logically derive an *explicandum* from an *explanans*, it should be obvious that the explanans must include two different kinds of 'assumptions,' namely general conjectures or hypotheses (assumptions of type 1) and assumptions about the specific initial and boundary conditions that characterize the case under examination (assumptions of type 2). Whether a deliberate use of 'unrealistic assumptions' can be a legitimate strategy in the enterprise of science is a question that must surely be answered differently, depending on whether assumptions of type 1 and type 2 are concerned.[7] The three examples that Friedman draws on in support of the "maximization-of-returns hypothesis" (Friedman 1953: 22) in economics are critically different in this regard.

The first example is about the claim that in many instances we can explain the fall of bodies in actual atmosphere quite well in terms of the law of gravity, even though that law is stated for conditions of vacuum (ibid.: 18). The 'unrealism' in this example clearly does not concern the conjectures employed (assumption type 1), as we surely consider the law of gravity to be realistic. What is unrealistic is the assumption that the particular conditions under which the law is applied are equivalent to a vacuum (assumption type 2).

In Friedman's second example, concerning the density of leaves around a tree (ibid.: 19f.), the situation is quite different. In this case the 'unrealism' does not concern the initial or boundary conditions (assumption type 2) but the general hypothesis

[7] U. Mäki (2007) appears to argue along similar lines even if not in the same terms.

(assumption type 1) that is employed in the explanation, namely "the hypothesis that the leaves are positioned as if each leaf deliberately sought to maximize the amount of sunlight it receives" (ibid.: 19). For the question of whether in science we can afford to work with 'unrealistic assumptions' must, however, surely be answered differently when we talk about assumptions of type 1, i.e. the general conjectures that we employ, or assumptions of type 2. The pragmatic reasons that may justify unrealistic assumptions about initial and boundary conditions cannot be used to justify unrealistic hypotheses, at least not as long as we consider it the principal aim of science to develop 'true' theories of how the world works. Even though in many instances it may well be possible to derive, and in this sense to 'explain,' an explicandum from an explicans that includes an unrealistic as-if hypothesis (or to derive a predicandum from such a predicans), we would hardly consider an explanation satisfactory that is based on knowingly unrealistic, i.e. false conjectures. Though knowingly unrealistic hypotheses may suffice for predicting (or, in the sense specified, 'explaining') *what* happens, they do not provide us with any insight into *why* it happens.

The same objections apply to Friedman's third example: the expert billiard player (ibid.: 21). Here, again, the 'unrealism' does not, as in the 'gravity' example, concern the assumptions about initial or boundary conditions but the general conjecture that is supposed to do the explaining, namely "the hypothesis that the billiard player made his shots *as if* he knew the complicated mathematical formulas … and could then make the ball travel in the direction indicated by the formulas" (ibid.: 21). Even though in this case, as in the leaves-example, the as-if hypothesis may suffice for pragmatic predictive and 'explanatory' purposes, it does not inform us about what actually accounts for the expert billiard player's skills[8] and, therefore, does not give an answer to the "why" question. And that means that as-if hypotheses cannot be part of a scientific theory that aims at answering "why"questions.

The objections raised above against the use of *as-if hypotheses* (by contrast to as-if assumptions about initial or boundary conditions) apply with equal force to Friedman's principal case: his defense of the "maximization-of-returns hypothesis," the hypothesis

[8] F.A. Hayek (1967: 44) notes in reference to Friedman's example: "So far we are able to describe the character of such skills we must do so by stating the rules governing the actions of which the actors will usually be unaware."

that businessmen "behave *as if* they were seeking rationally to maximize their expected returns … and had full knowledge of the data needed to succeed in this attempt" (ibid.: 21). There is, however, an additional issue involved here. So far, I have neglected the fact that the use of as-if hypotheses raises two separate issues: first, whether the behavior asserted by the hypothesis actually occurs; and second, whether it occurs for the reasons specified. In the cases of the leaves and the expert billiard players the 'as if' is about the latter, not the first issue. It is not meant to doubt that leaves and billiard players actually behave as they would if the respective as-if hypothesis were true. What is unrealistic is the assumption that they so act for the reasons the as-if hypotheses state. In economics, the controversy about the rational maximization hypothesis is, however, not only about whether economic agents maximize for the reasons the hypothesis asserts. Rather, it is also about the realism of the assumption that they actually behave as they would behave if the as-if hypothesis were true.

While readily admitting that what the maximization hypothesis assumes about *the reasons* for businessmen's behavior is unrealistic, Friedman insists that it is realistic in what it assumes about *how* they behave, employing an evolutionary selection argument in support of his claim: "Let the apparent immediate determinant of business behavior be anything at all – habitual reaction, random chance, or whatnot. Whenever this determinant happens to lead to behavior consistent with rational and informed maximization of returns, the business will prosper and acquire resources with which to expand; whenever it does not, the business will tend to lose resources … . The process of 'natural selection' thus helps to validate the hypothesis" (ibid.: 22). There are two problems with the 'evolutionary' defense of the as-if hypothesis. First, there is the issue of whether the selective forces that work in real world markets – rather than in the hypothetical world of perfect competition – exhibit sufficient strength to produce the de-facto maximizing behavior that Friedman claims they produce. Doubts about this are voiced by Kenneth J. Arrow (1987: 69), surely an unbiased witness, when he argues that "we need not merely pure but perfect competition before the rationality hypotheses have their full power."[9] If, however, as Friedman's argument implies, the maximization

[9] What is rational for an agent to do depends, of course, not only on his preferences but also on his beliefs 'about the world.' What is at issue, therefore, is under what conditions different beliefs can survive

assumption is more a claim about the working properties of markets than about human behavior as such,[10] its applicability "to all of human behavior" (Becker 1976: 8) appears even more doubtful than its general applicability to market behavior.[11] As Arrow (ibid.) notes, to the extent that one moves away from the context of competitive markets "the rationality assumptions become strained and possibly even self-contradictory."

The second problem with an evolutionary defense of the as-if hypothesis concerns the already-addressed issue of the actual explanatory contribution that as-if hypotheses can make. Even if the selective forces of evolution could justly be assumed to have brought about the kind of behavior the as-if hypotheses describe, a theoretical science could not be satisfied with explaining actual behavior in as-if terms.[12] Even though biological evolution has 'made' organisms capable of coping successfully with the problems they face in their typical environments, biologists would surely consider it most unsatisfactory to confine themselves in their explanations of animal behavior to the 'unrealistic' assumption that animals act as if they had perfect knowledge of the relevant laws of nature and acted upon them in a purposeful manner, no matter how well such as-if assumption might work for pragmatic purposes. They would rather want to give a more 'realistic' account of what the actual mechanisms are that allow animals to act in such ways. This is, for instance, what Ernst Mayr (1988; 1992) does with his theory of program-based behavior, a theory that explains adapted, purposeful behavior in terms of 'programs' which – as a result of evolution and individual learning – are stored in an organism and that incorporate knowledge about the world.[13] What makes biology a progressive science is that it provides ever deeper insights into the principles that govern the living world, searching for realistic assumptions about the actual forces at work. Had

---

and guide agents' actions. Under conditions of 'perfect competition,' mistaken beliefs about the world will be qickly corrected by learning, leading all agents to act on the same, true beliefs (Vanberg 2004a: 18ff.).

[10] Friedman's claim is that markets work in ways that make market participants act as if they maximize returns. This claim must be distinguished from the tenet that markets work as if they were populated by rational maximizers. The difference between the two claims has been illuminated by experimental economists who have pointed out that the results of market experiments are in accord with standard competitive models even if the agents do not make decisions systematically or are even – in the extreme – 'zero' intelligence robot agents (V. Smith 2003: 468, 475).

[11] See Vanberg (2004: 5ff.) for a discussion of G.S. Becker's defense of the rationality postulate.

[12] V. Smith (2003: 475): "And the claim that it is 'as if' agents had complete information, helps not a wit to understand the wellspring of behavior. What is missing are models of the process whereby agents go from their initial circumstances, and dispersed information, using the algorithms of the institution to update their status, and converge (or not) to the predicted equilibrium."

[13] See Vanberg (2002: 11ff.) for a summary of Mayr's argument.

biologists been satisfied with taking Darwin's theory as an excuse to work with as-if hypotheses, biology's capacity to illuminate our understanding of the varieties of animal behavior would surely be less than it is today. Reversely, had economists not comforted themselves with the 'as if' excuse they might have arrived at more satisfactory accounts of economic and other social behavior than the maximization of returns hypothesis is able to provide.

3. Adjusting the Utility Function

The alternative to Friedman's as-if response to the realism issue is for economists to seek to add realism to their behavioral model by modifying its components. There are two candidates for revising the notion that humans act so as to rationally maximize their utility. One can modify the assumption made about the content of the utility function and/or one can re-interpret what is precisely meant by "rational maximization." It is quite apparent that economists are much more reluctant to do the latter than the former. To be sure, they often emphasize that their models "do not necessarily presume anything in the way of reasoning ability, beyond that required to understand and perform in everyday social context" (Henrich and others 2005), and certain modifications of the perfect rationality assumption, such as the concept of 'Baysian rationality' (Albert 2003), have been suggested. Yet, systematic efforts to add 'realism' to the economic model of man have been typically confined to modifications in the utility function, allowing for a broader variety of preferences than pure material self-interest, while maintaining the notion that agents maximize their utility, whatever it is they derive utility from. A programmatic statement of this 'revisionist' strategy is, for instance, Gary S. Becker's (1996:4) comment on the purpose of his *Accounting for Tastes*: "This book retains the assumption that individuals behave so as to maximize utility while extending the definition of individual preferences to include … love and sympathy, and other neglected behavior."

My purpose in this section is to draw attention to what, as I suppose, is a fundamental inconsistency in some of the more recent attempts in behavioral and experimental economics to account for observed behavioral 'anomalies' by manipulating the contents of the utility function. My interest here is not in the often raised issue

whether adjusting the utility function to accommodate observed behavior does not result in mere ad hoc explanations. What I am concerned with is the fact that these 'revisionist' approaches are claimed to remain within the scope of the rational choice paradigm while in truth they imply, as I submit and explain below, a tacit paradigmatic shift from a rational choice perspective to a systematically different perspective.[14]

The issue that is at stake here is hinted at in K.J. Arrow's (1996: xiii) statement: "Choice is over sets of actions, but preference orderings are over consequences." – The very point of rational choice theory – by contrast to alternative behavioral paradigms – is to explain actions exclusively in terms of the consequences the actor expects to result from them. Actions are seen as pure means or instruments by which the actor seeks to bring about desired outcomes. His preferences over expected outcomes totally determine which course of action he will choose. According to the logic of rational choice theory, there can be no other reasons for choosing action A over action B than the agent's expectation that A will result in more preferable outcomes than B. This explanatory logic allows one to speak of a person's 'preferences over actions' as long as such preferences are understood as pure derivatives of her preferences over outcomes. It does not permit one, however, to introduce as explanatory variables preferences over actions '*as such*,' i.e. preferences for acting in certain ways that a person harbors for reasons that are prior to and independent of her preferences for the consequences she may expect to result from her actions in particular instances.

The above argument has straightforward implications for the kind of entries that are admissible for inclusion in the utility function if an explanation is still to qualify as a rational choice account. It is precisely in this regard that, as I submit, revisionist proposals for a more realistically defined utility function, such as the one prominently advocated by Ernst Fehr, have become ambiguous if not outright inconsistent. In a number of (co-authored) articles[15] Fehr has argued that the deviations from rational choice predictions that have been observed in a variety of experiments, in particular in ultimatum games, can be systematically accounted for if one relaxes the assumption of self-interest. The explanatory power of the rational choice paradigm, so he asserts, can be

[14] On this issue see also Vanberg 2006.

[15] See e.g. Fehr and Schmidt 1999; 2003; Fehr and Falk 2003; Fehr and Fischbacher 2000.

restored if one allows for "other-regarding" or "social" preferences to be included in individuals' utility functions, "in particular preferences for reciprocal fairness" (Fehr and Fischbacher 2000: C1f.), while maintaining the assumption that agents are fully rational maximizers given their utility functions. Leaving aside the details of Fehr's arguments, what I want to draw attention to is the ambiguity inherent in the notion of "preferences for reciprocal fairness" and the issue of whether including such preferences is consistent with the claim of providing a *rational choice account*.

Of particular relevance in the present context is the fact that there is a significant difference between describing 'social' preferences, such as "preferences for reciprocal fairness" as concerns "about the material resources allocated to relevant reference agents" (ibid.) and interpreting them as a "predisposition to reward others for cooperative, norm-abiding behaviors, and … a propensity to impose sanctions on others for norm violations" (Fehr and Fischbacher 2003: 785). In the first interpretation, "preferences for reciprocal fairness" are clearly *preferences for outcomes*, even if they are more broadly interpreted to include outcomes that affect the welfare of others. It is equally clear, though, that in the second interpretation "preferences for reciprocal fairness" must be considered *preferences for actions as such*. After all, it is difficult to see what having a "predisposition" or a "propensity" to act in certain ways can mean if not that a person will act for reasons that are separate from the consequences to be expected in the particular instance.

There is a paradigmatic difference between explaining actions in terms of how agents evaluate their expected outcomes and explaining them in terms of their predisposition to act in certain ways in certain kinds of situations. The first explanatory mode is within the domain of rational choice theory, the second is not. As I shall argue in more detail below, to explain actions in terms of behavioral dispositions is equivalent to invoking, in one form or another, the notion of rule-following behavior, i.e. the notion that actions are carried out not for the consequences they are expected to bring about in the particular instance but because they are in accordance with rules that the agent is inclined to follow. The inclusion of such "predispositions" or "propensities" in the utility function means to tacitly shift from one explanatory paradigm to an entirely different paradigm, namely from rational choice theory to a theory of rule-following behavior.

E. Fehr is surely not alone in committing the tacit paradigm shift that is at stake here.[16] A particularly instructive example is a recent, extensive report – coauthored by a number of economists, including Fehr, psychologists and researchers from other fields – on "a cross-cultural study of behavior in Ultimatum, Public Goods, and Dictator Games in fifteen small-scale societies" (Henrich et al. 2005: 795). The purpose of the article is to add cultural variety to previous experimental studies, mostly done with students in modern societies, that "have uncovered large, consistent deviations from the textbook predictions of Homo economicus" (ibid.: 797). The authors' principal claim is that a theoretical account of the observed 'deviations' can be provided by combining a rational choice approach – they call it the "preferences, beliefs and constraints approach" (ibid.: 812) – with "insights on human motivation and reasoning from psychology and neuroscience … under the ultimate-level evolutionary umbrella created by culture-gene coevolutionary theory" (ibid.). This claim supposes that combining the different perspectives renders an internally consistent theoretical account. In fact, however, the arguments presented in the article reflect the same kind of tacit paradigm shift that I have identified above in Ernst Fehr's argument.

The "preferences, beliefs and constraints approach" is said to be "rooted in the notion that individuals will select among alternatives by weighing how well the possible outcomes of each option meet their goals and desires. Theoretically, this is operationalized by assuming agents to maximize a *preference function* subject to informational and material *constraints*" (ibid.). Even though this statement clearly seems to imply that the "preferences" included as explanatory variables are *preferences over outcomes*, the authors do, in fact, tacitly invoke *preferences over actions as such* when they note that "such considerations as fairness, sympathy, and equity are critical for understanding the preference functions of many people" (ibid.), and when they speak of "inclinations towards fairness (equity) and 'tastes' for punishing unfairness" (ibid.: 797). They tacitly shift from a rational choice outlook to a different paradigm when they speak of "the development of differing *generalized behavioral dispositions*" (ibid.: 814), when they argue that "norms, such as 'treat strangers equitably' … become goals in themselves" (ibid.: 813), or when they refer to "socialization theory" as a source for

[16] For further references see Vanberg 2006.

understanding the "details of how norms get internalized" (ibid.). While including behavioral dispositions and norms surely adds explanatory power, it is misleading to pretend that they can be included in a rational choice framework while still maintaining the distinctive nature of its outlook on human action. As noted before, explaining actions in terms of how individuals weigh the possible outcomes of alternative options is categorically different from explaining them in terms of their *predispositions* to act in certain ways or their inclinations to follow *internalized norms*. It means to gloss over this fundamental difference when the authors speak of "behavioral rules (or sets of preferences)" (ibid.: 814) as if *preferences* (over outcomes) and *behavioral rules* were the same thing.

4. Preferences over Actions and Rule Following

According to its inherent logic, a rational choice approach that seeks to explain human behavior as the maximization of a utility or preference function has its focus on single acts of choice and it accounts for these acts of choice exclusively in terms of the consequences that potential alternative courses of actions are expected to bring about in the particular instance. Rational agents are assumed to decide each choice situation that they encounter 'on its own merits.' In each instance, they are predicted to choose from among available options the action that is predicted to result in the most preferred consequences. A rational choice theory, so defined, may allow for 'altruistic' or 'other-regarding' preferences, as long as these preferences are interpreted as *preferences over outcomes*. In its purely instrumental outlook at actions it can, however, not allow for actions to be chosen in terms of criteria that are different from, and independent of, the agent's preferences over outcomes, i.e. in terms of *preferences over actions per se*. Yet, such criteria or preferences over actions are inevitably – if only implicitly – invoked when "generalized behavioral dispositions" are argued to guide human behavior. The very point of invoking "predispositions" is to suppose that agents do not act merely in response to the consequences expected in particular instances, but according to *pre*conceived notions of what kind of behavior is 'appropriate' in the type of situations they are facing.

In a number of contributions, A. Sen has addressed the very issue that is at stake here, and it is instructive to take a look at his arguments. In reference to suggestions for how the rational choice model may be revised in order to account for observed behavior that appears to contradict the assumption of rational self-interest, Sen argues that a distinction must be drawn between accounting for *sympathy* and accounting for *commitment*. According to Sen, sympathy can without difficulty be accounted for within a rational choice framework, by broadening the concept of self-interest. "Indeed," he argues, "being self-interested does not require one to be self-centered in any way, since one can get joys and pains from sympathy to others, and these joys and pains are quintessentially one's own" (Sen 2002a: 31). Not only can concern for others be easily accommodated "within the utility function of the persons involved" (ibid.), concerns for any kind of 'goal' or 'value' that a person may be supposed to pursue can be accounted for in a rational choice framework, if 'rational choice' is defined in the minimal sense of maximizing an identifiable maximand. This is categorically different, though, so Sen insists, with commitment.[17] While our everyday experience as well as many empirical studies "indicate that committed behavior has its actual domain" (Sen 2002a:9), it cannot be accounted for by standard rational choice theory, even in its minimal version.[18] Accounting for committed behavior requires one, so Sen argues, to relax even the assumption of "self-goal choice", i.e. the assumption that a person's choices reflect her own goals, and to allow for the pursuit of private goals to "be compromised by the consideration of the goals of others" (Sen 2002c: 215).

As commentators like Philip Pettit have noted, Sen's claim that "people may become the executors of a goal-system that outruns the private goals that they endorse in their own name … is highly implausible" (Petit 2005: 19). After all, it is difficult to see in what sense human choice can be anything other than – in Sen's terminology –"self-goal choice." The difficulties inherent in Sen's notion of 'non-self-goal choice' can be easily avoided, however, if one restates his arguments on the nature of "committed behavior" in

[17] Sen (2002c: 214): "Sympathy – including antipathy when it is negative – refers to one person's welfare being affected by the position of others…, whereas 'commitment' is concerned with breaking the tight link between individual welfare (with or without sympathy) and the choice of action."

[18] Sen (2005a: 8): "A reason for the importance of taking note of commitment is that it can help to explain many patterns of behavior that we actually observe which are hard to fit into the narrow format of contemporary rational choice theory."

terms of the theoretical perspective that I have outlined above, a perspective that emphasizes the distinction between preferences over outcomes and preferences over actions, drawing attention to the intimate link between preferences over actions and rule-following behavior. In fact, Sen (2002c: 214) himself invites such restatement when he notes that "the violation of self-goal choice" involved in commitment may "arise from self-imposed restrictions on the pursuit of one's own goals (in favor of, say, following particular rules of conduct)."[19] Apparently it is, in particular, accounting for commitment to rules of behavior that Sen considers a "more fundamental" challenge to standard rational choice accounts than accommodating other-regarding preferences or non-self welfare goals or values (Sen 1973: 249ff.). Accepting "certain rules of conduct as part of obligatory behavior" is, as he (Sen 2002c: 216f.) puts it, "not a matter of asking each time, What do I get out of it? How are my own goals furthered in this way?, but of taking for granted the case for certain patterns of behavior towards others."[20]

Explaining actions in terms of pre-existing dispositions to follow rules rather than in terms of expected consequences does not mean to ignore that there are feedback effects of consequences on behavior. It means to redirect attention from the effects of *expected* consequences on *present* behavior to the effects that the *actual* consequences of *past* behavior have on *current* choices and on the effects that the actual consequences of *current* choices will have on *future* behavior. The behavioral dispositions that guide behavior at any moment in time are themselves the product of past behavioral consequences. They have been shaped by what agents have learned in the past – from direct and indirect experience – about what outcomes different kinds of behavior tend to produce under various kinds of circumstances. Nor does a theory of rule-following behavior take issue with the notion, central to rational choice theory, that human action is based on a 'calculus of advantage.' It only asserts that we must distinguish between different levels at which such calculus of advantage occurs, namely the level of single actions and the level of rules of action. It insists that, in addition to the situational

[19] See also Sen (2002a: 7): "[A] person's choice behavior may be constrained or influenced by the goals of others, or by rules of conduct…, thereby violating the self-goal choice." – Sen (2002c: 219f.): "[A] rejection of self-goal choice reflects a type of commitment that is not able to be captured by the broadening of the goals to be pursued. It calls for behavior norms that depart from the pursuit of goals in certain systematic ways … and it has close links with the case for rule-based conduct, discussed by Adam Smith.

[20] Sen 2002b: 178: "However, in following rules… the motivating factor need not be any concern about the well-being of others…, but simply following an established rule."

calculus on which rational choice theory focuses, human action is governed by a calculus of advantage that operates at the level at which behavioral dispositions are shaped in light of accumulated direct and indirect experiences.[21] Like rational choice theory a rule-oriented approach is 'utilitarian' in the sense of explaining human behavior in 'instrumental' terms, as a means for achieving desired outcomes. The difference between the two approaches parallels the distinction between act-utilitarianism and rule-utilitarianism. Rational choice theory looks at single actions as instruments for bringing about preferred outcomes. It explains actions in terms of the agent's *forward-looking* calculation of expected payoffs. By contrast, a rule-oriented approach looks at rules of actions as instruments or 'tools' for bringing about preferred *patterns* of outcomes. It explains single actions in terms of an agent's behavioral dispositions, and it explains these dispositions in turn in a *backward-looking* manner, i.e. in terms of past experiences, both direct and indirect.

As agents adopt dispositions to follow rules of action they will presumably experience *emotional consequences* from complying with or going against their behavioral inclinations. They may, for instance, feel uneasy if they 'deviate' from rules they are disposed to act on. Since these emotional consequences may appear to be like other consequences agents consider in their choice of actions, one might be inclined to conclude that behavioral dispositions can, after all, be accounted for by rational choice analysis as components in agents' utility functions. Such a conclusion would disregard, however, the essential fact that the very point of being disposed to follow rules is to act in certain ways in certain types of situation *without* considering the expected consequences in each instance. To be sure, agents may on occasion deliberately act against their rule-following inclinations, giving less weight to the 'bad conscience' from rule-violation than to the benefits it promises. And there are surely cases of calculated rule-compliance where agents consider the benefits to be had from rule-violation insufficient to compensate for the uneasiness felt from acting against their dispositions. Yet these cases are the very instances in which agents shift from a rule-following mode to situational, case-by-case choice, even if their situational calculus includes the emotional implications

[21] I shall return below (section 6) to the issue of how the 'calculus of advantage' at the level of behavioral rules operates.

of their behavioral dispositions. They definitely do not represent the 'standard' cases of rule-following, i.e. the cases in which behavioral dispositions induce agents to act on preconceived notions of appropriate behavior without calculating the expected payoffs from potential alternative courses of action. It is these cases, however, that do not fit the rational choice model.

5. The Rationale of Rule-Following Behavior

At the heart of F.A. Hayek's theoretical contributions is the argument that the inherent limitations of our knowledge and our powers of reason require us to rely on the guidance of rules if we are successfully to live our lives and to coordinate our actions with others in a complex world. The "whole rationale of the phenomenon of rule-guided action" is, as he submits, to be found in our "inescapable ignorance of most of the particular circumstances which determine the effects of our actions" (Hayek 1976: 20). Faced with the "inexhaustible totality of everything," so Hayek (1979: 121) argues, we would soon be incapacitated if we were to decide each case on its own merits, as rational choice theory would have it.[22] Due to "our constitutional ignorance" (ibid.: 8) we cannot but rely on rules that in the past have proven – in our own experience or the experience of others, including our ancestors' – to be helpful in dealing with recurrent problems of the kind we are likely to encounter in the environments in which we operate.

Rules facilitate, Hayek explains, the making of decisions in complex situations. They "limit our range of choice" (1967: 90) by abbreviating the "list of circumstances which we need to take into account in the particular instances, singling out certain classes of facts as alone determining the general kind of action which we should take" (Hayek 1964: 11). The fact that rules *abbreviate* what we need to take into account and *limit* our range of choice means, of course, that they lead us to *disregard* facts which we may well know and to leave potential courses of action *unconsidered*. As Hayek notes, why such disregarding of facts and limiting of choice should help us make better decisions, is far

[22] V. L. Smith (2003: 468): „It is necessary to constantly remind ourselves that human activity is diffused and dominated by unconscious, automatic, neuropsychological systems that enable people to function effectively without always calling upon the brain's scarcest resource – attentional and reasoning circuitry. This is an important economizing property of how the brain works. If it were otherwise, no one could get through the day under the burden of the self-conscious monitoring and planning of every trivial action in detail."

from being intuitively obvious. Yet this apparent paradox can be explained, he states, by the very "necessity of coming to terms with our unalterable ignorance of much that would be relevant if we knew it" (1964: 12).[23]

Because it is impossible to act "in full consideration of all the facts of a particular situation" (1973: 30), so he reasons, we cannot but act on the basis of *selective knowledge*, i.e. considering only a fraction of the innumerable potentially relevant facts. The issue is, therefore, which *mode of selection* promises to render overall more preferable outcomes: the selectivity inherent in situational, case-by-case choices, or the selectivity of rules? And, as Hayek argues, the latter may well be superior to the former (1964: 12) insofar as acting on suitable rule may, on balance, result in a more favorable pattern of outcomes than discretionary case-by-case choice.[24]

In a somewhat more formal manner, Ronald A. Heiner (1983) has essentially made the same argument as Hayek concerning the rationale of rule-following behavior. Heiner takes as benchmark the notion of a *perfect* agent, i.e. an agent who is able to determine with perfect reliability what, considering all circumstances, is the maximizing choice in each and every situation. For such an agent, Heiner argues, case-by-case maximization would obviously be the best policy. To the extent, however, that an agent is *not perfect*, in the sense defined, he may possibly fare better overall by adopting rules for how to behave in recurring problem-situations, even though rule following will inevitably on occasion result in less than optimal outcomes. The relevant comparison here is, of course, between, on the one side, the risk of – and the expected damage from – choosing a 'wrong' alternative while attempting to maximize case by case, and, on the other side, the risk of – and the expected damage from – missing out on 'preferred exceptions' when following a rule. The first risk is correlated with what Heiner calls the 'competence' of the agent, where competence is defined relative to the difficulty or complexity of the

---

23 F.A. Hayek (1960: 66): "Though it sounds paradoxical to say that in order to make ourselves act rationally we often find it necessary to be guided by habit rather than reflection, or to say that to prevent ourselves from making the wrong decision we must deliberately reduce the range of choice before us, we all know that this is often necessary in practice if we are to achieve our long-range aims."

24 Where the 'balance of advantage' is in favor of following a rule, "an apparent striving after rationality in the sense of fuller taking into account all the foreseeable consequences" may, as Hayek (1964: 12) argues, result in "greater irrationality, less effective taking into account of remote effects and an altogether less coherent result."

decision-problem. The second risk is a function of the nature or 'quality' of the rule in question. Accordingly, whether rule following may in fact be superior to attempted case-by-case maximization will depend on the combined effects of i) the complexity of the problem-situation, ii) the competence of the agent and, iii) the nature or 'quality' of the behavioral rule.

An imperfect agent apparently faces the problem of finding a proper balance between two 'imperfections': The imperfectness of his own choice, and the imperfectness of the decision-rule which he applies. The maxim 'always choose the best alternative' would obviously generate optimal outcomes, if it could be reliably administered. But it need not be the best strategy for an imperfect agent who is unable to choose optimally with perfect reliability. He may fare better with an imperfect rule, but one which he can apply more reliably. The degree of 'imperfectness' of a rule can be defined in terms of the frequency of cases in which deviating from the rule would be preferable to the agent or – stated differently – in terms of the rate of *preferred exceptions*. It will in general be the case that *simpler* rules are more *imperfect*, have a higher rate of 'preferred exceptions' than more complex rules.[25] But for the same reason - namely their simplicity - they can be applied more reliably. And what matters to imperfect agents is the combined product of the two aspects.

Hayek's and Heiner's arguments are about the rationale of rule-following behavior. They identify reasons why it may be 'rational' – in the sense of serving their interests – for imperfect agents to follow rules instead of acting in a discretionary, case-by-case manner. Whether rule following will in fact result in patterns of outcomes that are preferable to what discretionary case-by-case choice would generate depends, of course, on the nature of the rules that are followed. Rules will differ in their 'quality' and one can easily imagine rules which would be clearly inferior to case-by-case choice. Furthermore, among the rules which 'work better' some will tend to generate more advantageous patterns of outcomes than others. This raises the question of how agents come to adopt rules at all, and how they come to adopt certain kinds of rules rather than others.

---

[25] Since rules can be translated into "if … then"-statements their complexity can be interpreted as a function of the specifications or qualifications enumerated in their "if"-clauses and / or their "when"-clauses.

6. The Explanation of Rule-Following Behavior

Explaining the *rationale* of rule-following is, of course, not the same as explaining why it is that agents actually do follow rules and why they follow certain rules rather than others. Human agents cannot choose to adopt rules in the same manner in which they can choose among alternative courses of action. They cannot simply 'switch off' their capacity for discretionary choice, nor would they have the cognitive abilities to reliably choose the rules that may serve their interests best. The disposition that defines rule-following behavior – namely not to calculate in a case-by-case manner – is a matter of habit formation and not a trait one can simply decide to adopt because one recognizes its advantages.[26] The very limits of knowledge and reason that require imperfect agents to rely on rules deprive them likewise of the ability to reliably anticipate the relative merits of potential alternative rules of action. In fact, predicting which rules from the unlimited universe of conceivable alternatives will produce more advantageous outcome patterns over time than others presents imperfect agents with an even more daunting challenge than anticipating and comparing the prospective payoffs from the limited set of choice options they confront on a particular occasion.

Accordingly, when I said above that behavioral dispositions are based on a 'calculus of advantage' this is, of course, not meant to imply that they are the product of deliberate calculation. It is meant to say that the process in which dispositions are formed must include some 'method of accounting' that keeps track of the comparative performance of different behavioral practices in different types of situations, i.e. of how well they work in helping agents to cope with recurrent problems of the kind they are likely to encounter in the type of environment in which they operate. In the remainder of this section, I shall take a look at a research perspectives, the common thrust of which is that such 'method of accounting' can in fact be identified at three levels: the level of biological evolution, the level of cultural evolution, and the level of individual learning. The processes of learning or 'accumulation of knowledge' that operate at these three levels are seen to be governed by the same general evolutionary principle, the principle of

[26] David Gauthier's (1986) concept of "constrained maximization" and Edward F. McClennen's (2004) concept of "resolute choice" entail the claim that rational agents can *choose* to become rule-followers on account of their insight into the advantages to be expected thereof. For a critical examination of this claim see e.g. J. Dreier (2004: 164ff.) and Vanberg (1994: 54ff.).

trial and error elimination or variation and selective retention, even if the specific modes of their operation may be quite different.

Rules can assist agents in dealing with recurrent problems because they incorporate knowledge about relevant contingencies in the agents' typical environment. The issue of how the acquisition of such knowledge can be explained is the subject of K.R. Popper's evolutionary theory of the growth of knowledge. All behavior, so Popper (1982: 150) argues, is about problem solving, and all problem solving is guided by pre-existing expectations or conjectural knowledge about the world, knowledge that is incorporated in agents' "action programmes" (Popper and Eccles 1983: 134) or their "dispositions to act" (ibid.: 130).[27] It is, as Popper stresses, only in light of its repertoire of expectations that a living being can perceive problems, and it is only on the basis of its conjectural knowledge or dispositions that it can act or respond to the problems it faces (Popper 1976: 139).[28] Since, in this sense, all perception and action occurs on the basis of pre-existing conjectural knowledge or dispositions, an agent's *acquisition of knowledge* or *learning* can only consist in the modification or correction of pre-existing expectations, dispositions or action programs.[29] In Popper's (1972: 71) terms: "All acquired knowledge, all learning, consists of the modification ... of some form of knowledge, or disposition, which was there previously, and in the last instance of inborn expectations."[30] Learning consists in the "tentative variation of theories or action programmes and their critical testing, by using them in our actions" (Popper and Eccles 1983: 134). As Popper emphasizes, his suggested outlook at the acquisition of

---

[27] Popper and Eccles (1983: 130): "Our unconscious knowledge can well be described as a set of dispositions to act, or to behave, or to expect." – "We act on the basis of action programmes" (ibid.: 132).

[28] Popper and Eccles (1983: 134f.): "All observations … are interpretations in the light of theories. … *There is no sense organ in which anticipatory theories are not genetically incorporated.* … Thus our sense organs are products of adaptation – they can be said to be theories, or to incorporate theories."

[29] Popper and Eccles (1983: 132): "Learning by experience consists in modifying our expectations and theories and our action programmes. It is a process of modification and of selection, especially by the refutation of our expectations. … We learn by modifying our theories or our action programmes by selection, that is to say, by trial and by the elimination of error."

[30] Popper and Eccles (1983: 121): "There are two great sources of our information: that which is acquired through genetic inheritance and that which is acquired throughout our life. Moreover all knowledge, whether inherited or acquired, is historically a modification of earlier knowledge; and all knowledge can be traced back, step by step, to modifications of inborn or instinctive knowledge." – Popper (1972: 347): "Ontogenetically (that is, with respect to the development of the individual organism) we thus regress to the state of the expectations of a newborn child; phylogenetically (with respect to the evolution of the race, the phylum) we get to the state of expectations of unicellular organisms. … There is, as it were, only one step from the amoeba to Einstein."

knowledge can be viewed as a "Darwinian theory of the growth of knowledge" (Popper 1972: 262).[31] It is an approach that he regards as equally applicable "to animal knowledge, pre-scientific knowledge, and to scientific knowledge" (Popper 1972: 261), notwithstanding the obvious differences that may otherwise set these quite distinct levels of knowledge apart.[32]

Popper's theory of the growth of knowledge is counted among the founding contributions to the research paradigm of *evolutionary epistemology*,[33] along with contributions by F.A. Hayek and Ernst Mayr that also deserve to be briefly considered here.[34] In his *The Sensory Order – An Inquiry into the Foundations of Theoretical Psychology* (1952), as well as in some of his other writings on epistemological issues (1967a,b,c,d; 1978; 1979: 31ff.), Hayek has outlined a theory of the human mind that is very much compatible with Popper's evolutionary account. In Hayek's account, it is through the mind's "internal representations" of the outer world – through models, rules or dispositions[35] – that all human *perception* as well as human *action* is guided, from our pre- or sub-conscious adaptations to our most deliberate and reflected responses to problems (Hayek 1952: 86f.; 145f.; 1967c: 45). Like Popper, Hayek views the conjectural knowledge that the "internal representations" embody as the product of a process of trial-and-error elimination. More specifically, he interprets the process through which mental

---

[31] Popper (1972: 142): "Epistemology becomes ... the theory of the growth of knowledge. It becomes the theory of problem solving or, in other words, of the construction ... and critical testing of competing conjectural theories."

[32] Popper and Eccles (1983: 133): "On all three levels of adaptation (the genetic level, the behavioral level, the level of scientific theory formation) adaptive changes always start from some *given structure*. … But the new adaptive changes in the inherited structure happen on all three levels by way of natural *selection*: by way of competition, and of the elimination of unfit trials."

[33] The name "evolutionary epistemology" appears to have been coined by Donald T. Campbell (1974). According to Campbell, the central tenet of this research program is that all processes that lead to an *expansion* of knowledge or problem-solving capacity can be interpreted as instances of the "variation and selective retention process of evolutionary adaptation" (ibid.: 450f.), whether they occur at the level of genetic evolution, individual learning or cultural evolution.

[34] In his survey of the field W.W. Bartley (1987: 20f.) lists K.R. Popper, F.A. Hayek, D.T. Campbell, E. Mayr and K. Lorenz as "founders."

[35] Hayek uses the terms 'models,' 'rules' and 'dispositions' alternatively to describe the mental events that take place "between the input of (external and internal) stimuli and the output of action" (Hayek 1982: 288). – While in *The Sensory Order* he mostly speaks of 'models,' in later publications he prefers to speak of "rules of action (or dispositions)" (Hayek 1978: 43). As he notes: "(D)ispositions toward *kinds* of movements can be regarded as adaptations to typical features of the environment, and the 'recognition' of such features as the activiation of the kind of disposition adapted to them. ... (A)ll the 'knowledge' of the external world which such an organism possesses consists in the action patterns which the stimuli tend to evoke. ... (W)hat we call knowledge is primarily a system of rules of action" (ibid.: 41).

models, rules or dispositions become better adapted to the problem environment as a process of classification and reclassification that is controlled by success and failure (Hayek 1952: 147).[36] In Hayek's account, the evolution of the mental order proceeds as a continuous reorganization of the classificatory apparatus in light of which external events are interpreted, at the level of biological evolution as well as at the level of behavioral learning (Hayek 1952: 107f.; 1967c: 52). While the 'knowledge' that has been accumulated over the evolutionary history of our species is incorporated, as genetically coded conjectures, in our sense (and other) organs, the capability of learning allows an organism to accumulate experience-based problem-solving knowledge over its lifetime that is incorporated in memory-coded models, rules or dispositions (Hayek 1952: 53, 106, 108, 129ff., 166; 1967c: 51).

Biologist Ernst Mayr has proposed a theory of "teleonomic," or goal-directed, behavior that attributes the capacity of organisms to solve the problems they face to "programs" that guide their behavior (Mayr 1992: 127). A "program," in the sense Mayr uses the term, is "a set of instructions" (ibid.: 128) that embodies knowledge about relevant properties of the problem-environment. The focus of Mayr's theory is, in his terms, on the *encoding* and *decoding* of the internal models or *programs* on which problem-solving behavior is based. Encoding is about the processes through which programs are "recorded" in an organism. It is about the manner in which programs are stored, and about the ways in which they become adapted to the kind of problem environment in which the individual operates. It is governed by feedback processes that establish a link between the effects of programmed instructions and their future role in guiding behavior. Since programs can be viewed as stored knowledge of the world, encoding can be seen as a process of learning: experience is used to "improve" the program-repertoire, i.e. to make it a more suitable guide to successful problem solving. Decoding is about how programs are implemented in, or applied to, particular choice situations. It is a matter of information processing: information retrieved from the current

[36] About the general outlook he adopted in *The Sensory Order*, Hayek has noted in retrospect that he was led "to interpret the central nervous system as an apparatus of multiple classification or, better, as a process of continuous and simultaneous classification and constant reclassification on many levels (of the legion of impulses proceeding in it at any moment), applied in the first instance to all sensory perception but in principle to all kinds of mental entities, such as emotions, concepts, images, drives, etc., that we find to occur in the mental universe" (1982: 289).

(internal and external) situation and information stored in the program-repertoire is processed and translated into action.[37] According to Mayr, all encoding processes can be said to be based on "natural selection" in the sense that all programs, genetically encoded as well as memory-encoded learned programs, are selected by their consequences.[38] Programs that generate "successful" problem-solving behavior are reinforced and retained, those that systematically lead to less conducive outcomes lose strength and are eventually abandoned. Even though the particular feedback mechanisms that implement such "natural selection" are surely different in genetic evolution and in individual learning, the general principle of "selection by consequences" is the same.

An instructive attempt to model in a more formal manner the process of program-adaptation and behavioral learning to which Popper's, Hayek's and Mayr's evolutionary accounts refer is John H. Holland's theory of "adaptive agents," i.e. agents who adapt the repertoire of rules on which they act to the contingencies of their environment "as experience accumulates" (Holland 1995: 10). By contrast to a theory that is "built around agents of perfect rationality – agents that perfectly foresee the consequences of their actions, including the reactions of other agents" (ibid.: 85) – Holland characterizes his theory as an "evolutionary approach to learning" (1996: 282). Adaptive agents owe their "ability to anticipate" (Holland 1992b: 20) to the rules on which they operate, "rules that anticipate the consequences of certain responses" (ibid.), and that can be "viewed as hypotheses that are undergoing testing and confirmation" (Holland 1995: 53). The principal focus of Holland's theory is on the process by which adaptive agents manage to improve their repertoire of rules and, thereby, to increase their capability to deal successfully with the kinds of problems they are confronted with. The process in which adaptive agents improve the internal models that guide their problem-solving efforts is explicitly modeled as an evolutionary process of variation and selection by consequences.[39] There always exists a set of rules upon which selection can operate and from which new rules are continuously generated, due to random mutation and, more

---

[37] Mayr (1988: 51): "The translation of programs into teleonomic behavior is greatly affected both by sensory inputs and by internal physiological (largely hormonal) states."

[38] Mayr (1988: 45): "Each particular program is the result of natural selection, constantly adjusted by the selective value of the achieved end point, ... (whether) through a slow process of gradual selection, or even through individual learning or conditioning ... ."

[39] Holland (1995: 53): "That is, rules amount to alternative, competing hypotheses. When one hypothesis fails, competing rules are waiting in the wings to be tried."

importantly, through re-combination of components of existing rules. In order for selection to systematically favor 'beneficial' and to work against 'inferior' rules, a feedback or accounting mechanism must be in place that assigns 'credit' to behavioral practices according to the contribution they make to an agent's ability to operate successfully in the environment that he faces. The method of "credit assignment"[40] that serves this function must, in particular, be able to give proper credit to behavioral practices or rules that are not themselves followed by immediate rewards, but rather serve in a stage-setting role in the sense of being part of extended chains of actions only the last links of which are directly 'rewarded.'[41]

It is a significant achievement of Holland's approach that it specifies a model of how such credit assignment operates, called the "bucket brigade algorithm" (Holland 1995: 56; 1992a: 176ff.), a model the general thrust of which can be captured by the metaphor of a market in which not only the final sellers of products are rewarded by the price paid by consumers, but in which the revenue raised in the final product market is transferred back to the producers of inputs for these products, to the producers of inputs for the production of inputs, and so on. Thus, 'stage setting' productive activities upon which success in the final product market depends are encouraged, while failure in the final stage translates into inability to reward suppliers of inputs. In similar ways the "bucket brigade algorithm" models the ways in which adaptive agents carry on a "calculus of advantage" at the level of rules of action that assigns credit to – and thus strengthens – rules according to their respective contribution to the agents' overall success in solving the problems they encounter in their environments (Holland 1996: 285f.). As Holland (ibid.) emphasizes, the "bucket brigade algorithm" makes manageable a task that otherwise would surely be beyond the capacity of boundedly rational agents, namely the task of keeping track of the success record of a complex repertoire of rules that are activated, in varying combinations, as components of internal models of current problem-situations.

---

[40] Holland (1995: 53): "We want to assign each rule a strength that, over time, comes to reflect the rule's usefulness to the system. The procedure for modifying strength on the basis of experience is often called *credit assignment*."

[41] Holland et al. (1986: 16): "Credit assignment is not particularly difficult when the system receives payoffs from the environment for a particular action – the system simply strengthens all the rules active at that time (a kind of conditioning). Credit assignment becomes difficult when credit must be assigned to early-acting rules that set the stage for a sequence of actions leading to payoff."

Holland's concept of "credit assignment" can be related to what above I have described, somewhat informally, as *preferences over actions*. In Holland's "bucket brigade algorithm" the credits assigned to particular rules determine the strength of an agent's inclination or disposition to act on them. Conversely, the strength of an agent's dispositional 'commitment' to rules is a function of the 'credits' assigned to the respective practices over the agent's past behavioral history. What I have called an agent's "preferences over actions" can, in this sense, be interpreted as the product of learning processes – including the processes of biological and cultural evolution – in which experiences with the capacity of alternative behavioral practices to further the agent's wellbeing have been accumulated and have been 'condensed' in the agent's dispositional attachment to the respective practices, i.e. the strength of his inclination to act in certain ways in certain types of situations.

For agents to develop dispositions to follow rules does not mean, of course, that they become entirely oblivious to the overall incentive structure of the choice situations they are facing, responding only to the 'clues' that let them classify a given situation as one to which a particular rule applies. Even though human behavior, including moral conduct, is surely 'routinized' to a large extent in the sense that much of our everyday conduct is carried out semi-automatically and without any involvement of conscious deliberation, we cannot, as noted before, simply 'switch off' our capacity for rational calculation, and anything unusual in the choice situations we encounter may activate this capacity. The 'function' or 'evolutionary rationale' of the fact, mentioned above, that emotional consequences tend to be associated with following or deviating from rules that one is disposed to act on may well lie exactly in the role they play in 'stabilizing' our rule-following dispositions in the face of opposing situational incentives.[42] The conflict that persons experience in such situations is not about a trade-off between different elements in the utility function as is suggested by authors who treat concerns for equity,

[42] The role of emotions in human decision making has recently found growing attention in economics (Frank 1988; Elster 1996, 1998; Loewenstein 2000; van Winden 2001; Bosman, Sutter and van Winden 2005). What is of particular interest in the context of the present paper is that in this literature two different interpretations of the role of emotions are discussed: on the one hand, their role "as psychic costs or benefits that enter into the utility function on a par with satisfaction derived from material rewards" (Elster 1998: 64) and, on the other hand, their role as "an action tendency" (ibid.: 99), as a "pattern or readiness, which is the urge to execute a particular form of action or to abstain from a particular action" (Bosman, Sutter and van Winden 2005: 412).

fairness and the like as preferences over outcomes. Instead, it is a conflict between agents' preferences for acting according to rules that the above discussed 'accounting mechanism' tells them work well in situations of the type currently encountered, and their preferences for outcomes that their situational calculation tells them they may achieve by deviating. The intensity of this conflict will depend on the strength of their dispositional commitments versus the attractiveness of the outcomes that they expect from rule violation.[43]

7. Conclusion

Contrasting, as I have done in this paper, rational choice theory and a theory of rule-following behavior raises the question of the relation between the two perspectives. Are they to be considered as fundamentally disjunct and mutually exclusive outlooks at behavior, or can they be integrated into a coherent, unified theory of human conduct? If we acknowledge, as we surely must, that both, forward-looking calculated choice as well as backward-looking dispositions to follow rules, are relevant aspects of human behavior – that, as Hayek puts it in the quotation chosen as motto for this paper, "man is as much a rule-following animal as a purpose-seeking one" – it would certainly be unsatisfactory to assign the study of these aspects to two entirely separated conceptual frameworks. The natural ambition of scientific inquiry would seem to be to come up with a unified theory of human behavior that accounts for its more calculative as well as for its more rule-guided versions in terms of one coherent set of explanatory principles.

There appear to be two principal candidates for attempts at providing such an integrated theoretical outlook. One can either seek to show that what we classify as rule-following behavior can in fact be integrated in a properly adjusted rational choice framework. Under the rubric "Adjusting the Utility-Function" I have discussed and criticized an example of this strategy in section 3. The other candidate for a strategy of theoretical integration is to show that what we classify as rational, calculated choice can in fact be accounted for by a properly interpreted theory of rule-following behavior. It is in support of this second strategy that I want to provide a few concluding comments.

[43] The function of emotions in 'stabilizing' rule-following behavior has been discussed in detail by Robert Frank (1988) under the rubric of "emotions as commitment devices."

Rational choice theory ascribes our capacity for forward-looking problem solving to the fact that we are *rational* beings, without bothering to explain where the knowledge that supposedly defines our 'rationality' comes from. By contrast, the common thrust of the theoretical approaches that I have discussed in the previous section is twofold. It is, first, that the knowledge that guides our problem-solving efforts can be derived from no other sources than past experiences, be it the experiences that our species accumulated over its evolutionary history or be it the experiences that we, as individuals, have accumulated over our lifetime, on the basis of our genetic inheritance and in the context of a social environment that in turn has been shaped by experiences accumulated in the process of socio-cultural evolution. And it is, second, that such experience-based knowledge can exist in no other form than as 'conjectures' or 'programs' that are stored, as encoded information, in our genes and in our memories.

If, as Popper, Hayek, Mayr and Holland assert, *all* problem-solving behavior is based on pre-existing conjectures, programs or rules then – by distinguishing between rational choice and rule-following behavior – we cannot mean that only the latter is program-guided while as rational choosers we can do without the guidance of experience-based conjectural knowledge. The distinction can only be about the *degree* to which we consciously rely on the knowledge incorporated in memory-stored programs or conjectures as opposed to habitual, unreflected rule following. There surely is a significant difference between situations in which we explicitly consider the alternative choice options available to us, carefully weighing the consequences to be expected from each of them, and situations in which we solve recurrent problems in a routine manner, often without any awareness of what we are doing. Yet, even the most deliberated and calculated choices we make are 'program-based' in the sense that they employ memory-coded conjectural knowledge of relevant contingencies in the world around us. Furthermore, as Hayek (1976: 56) notes, "even decisions which have been carefully considered will in part be determined by rules of which the acting person is not aware."

Thus, rather than thinking of rational choice and rule-following behavior as two categorically different modes of human conduct, it is, as I submit, more appropriate to think of them as part of a continuum, along which program-based problem solving can vary from entirely unconscious rule following to highly calculated conjecture-based

choice.[44] This is not to deny that humans may also act in entirely novel ways, unaided by their evolved repertoires of conjectures, rules and programs. Yet, as notably D.T. Campbell (1987) has stressed, it means to recognize that, where our problem-solving efforts go beyond what the knowledge incorporated in our repertoire of programs can teach us, we cannot go but blindly. Such genuinely 'non-programmed' choices cannot be 'rational' in the sense of benefiting from pre-knowledge of what may be successful strategies for dealing with the problem that is addressed. It is worth noting in conclusion what Herbert A. Simon, whose name has figured more prominently than anybody else's in the debate on the limits of the economic model of rational choice, has commented on this issue. In the context of his theory of bounded rationality[45] he draws a distinction between "programmed" decisions[46] and "non-programmed" decisions (Simon 1982: 380), but he hastens to add that, ultimately, all decisions rely on 'internal models' and are, in this sense, program-based, even if they may be "non-programmed" in the sense that "processes of innovation" (ibid.: 393) and "the construction of new programs" (ibid.: 396) are initiated when existing programs fail to lead to successful problem solving. As Simon (ibid.: 380) puts it: "Are there any decisions, then, that are *not* programmed? If we want to be literal, … any sequence of events in which each event is determined in some way by the whole collection of its antecedents is 'programmed.' In these terms, even searching through a haystack for a needle is programmed choice – and perhaps it is."

.

---

[44] For a critical discussion of this view see J. Vromen (2004: 14ff.).

[45] Simon (1984: 47f.): "In any realistic description of the environment of a human decision maker, the variables and information to which he might attend … are innumerable. The hypothesis of bounded rationality claims that human beings handle this difficulty by attending to only a small part of the complexity about them. They make a highly simplified model of the world, and they make their decisions in terms of that model and the subset of variables that enter into it."

[46] Simon (1982: 389): "We should view programmed decision-making as a process for making choices within the framework set by highly simplified models of real-world problems."

References

Albert, Max 2003: "Bayesian Rationality and Decision Making: A Critical Review," Analyse & Kritik 25, 101-117.

Arrow, Kenneth J. 1987: "Economic Theory and the Hypothesis of Rationality" in *The New Palgrave Dictionary of Economics*, Vol. 2, London: Macmillan, 69-75.

Arrow, Kenneth J. 1996: Preface, in: K.J. Arrow, E. Colombatto, M. Perlman and C. Schmidt (eds.), *The Rational Foundations of Economic Behavior*, Proceedings of the IEA Conference held in Turin, Italy, New York: St. Martin's Press, xiii-xvii.

Becker, Gary S. 1976: *The Economic Approach to Human Behavior*, Chicago and London: The University of Chicago Press.

Becker, Gary S. 1996: *Accounting for Tastes*, Cambridge, Mass., and London: Harvard University Press.

Bosman, Ronald, Matthias Sutter and Franz van Winden 2005: "The impact of real effort and emotions in the power-to-take game," *Journal of Economic Psychology* 26, 407-429.

Campbell, Donald T. 1974: "Evolutionary Epistemology," in: Paul A. Schipp, ed., *The Philosophy of Karl R. Popper*, La Salle, Illinois: Open Court, 413-463.

Campbell, Donald T. 1987: "Blind Variation and Selective Retention in Creative Thought as in Other Knowledge Processes," in: Radnitzky, Gerard and W. W. Bartley, III (eds.), *Evolutionary Epistemology, Rationality, and the Sociology of Knowledge*, La Salle, Illinois: Open Court, 91-114.

Dreier, James 2004: "Decision Theory and Morality," in: Alfred R. Mele and Pies Rawling, eds., *The Oxford Handbook of Rationality*, New York: Oxford University Press, 156-181.

Elster, Jon 1996: "Rationality and the Emotions," *The Economic Journal* 106, 1386-1397.

Elster, Jon 1998: "Emotions and Economic Theory," *Journal of Economic Literature* XXXVI, 47-74.

Fehr, Ernst and Klaus M. Schmidt 1999: „A Theory of Fairness, Competition and Cooperation," *Quaterly Journal of Economics* 114, 817-868.

Fehr, Ernst and Armin Falk 2003: "Reciprocal Fairness, Cooperation and Limits to Competition," in: E. Fullbrook (ed.), *Intersubjectivity in Economics, Agents and Structure*, London and New York: Routledge, 28-42.

Fehr, Ernst and Urs Fischbacher 2002: "Why Social Preferences Matter – The Impact of Non-Selfish Motives on Competition, Cooperation and Incentives," *The Economic Journal* 112, C1-C33.

Fehr, Ernst and Urs Fischbacher 2003: "The nature of human altruism," *Nature* 425, 785-791.

Fehr, Ernst and Klaus M. Schmidt 2003: „Theories of Fairness and Reciprocity: Evidence and Economic Applications," in: M. Dewatripont, L.P. Hansen, S. Turnovski (eds.), *Advances in Economic Theory, Eighth World Congress of the Econometric Society*, Vol. 1, Cambridge: Cambridge University Press, 208-257.

Frank, Robert H. 1988: *Passions Within Reason. The Strategic Role of Emotions*, New York and London: W.W. Norton & Company.

Friedman, Milton 1953: "The Methodology of Positive Economics," in: *Essays in Positive Economics*, Chicago and London: The University of Chicago Press, 3-43.

Gintis, Herbert and Rakesh Khurana 2006: "Corporate Honesty and Business Education: A Behavioral Model," Paper presented at IEA Workshop on Corporate Social Responsibility (CSR) and Corporate Governance, Trento, Italy, 11-13 July, 2006.

Georgescu-Roegen, Nicholas 1971: *The Entropy Law and the Economic Process*, Cambridge (MA) und London: Harvard University Press.

Hayek, Friedrich A. 1952: *The Sensory Order – An Inquiry into the Foundations of Theoretical Psychology*, Chicago: The University of Chicago Press.

Hayek, Friedrich A. 1960: *The Constitution of Liberty*, Chicago: The University of Chicago Press.

Hayek, Friedrich A. 1964: "Kinds of Order in Society," *New Individualist Review* 3, 3-12.

Hayek, Friedrich A. 1967a: "Degrees of Explanation," in *Studies in Philosophy, Politics and Economics*, Chicago: The University of Chicago Press, 3-21.

Hayek, Friedrich A. 1967b: "The Theory of Complex Phenomena," in *Studies in Philosophy, Politics and Economics*, Chicago: The University of Chicago Press, 22-42.

Hayek, Friedrich A. 1967c: "Rules, Perception and Intelligibility," in *Studies in Philosophy, Politics and Economics*, Chicago: The University of Chicago Press, 43-65.

Hayek, Friedrich A. 1967d: "Kinds of Rationalism," in *Studies in Philosophy, Politics and Economics*, Chicago: The University of Chicago Press, 82-95.

Hayek, Friedrich A. 1973: *Law, Legislation and Liberty*, Vol. 1, *Rules and Order*, London: Routledge & Kegan Paul.

Hayek, Friedrich A. 1976: *Law, Legislation and Liberty*, Vol. 2, *The Mirage of Social Justice*, London: Routledge & Kegan Paul.

Hayek, Friedrich A. 1978: "The Primacy of the Abstract," in *New Studies in Philosophy, Politics, Economics and the History of Ideas*, Chicago: The University of Chicago Press, 35-49.

Hayek, Friedrich A. 1979 [orig. 1952]: *The Counter-Revolution of Science*, Indianapolis: Liberty Press.

Hayek, Friedrich A., 1982: "The Sensory Order After 25 Years," in: W.B. Weimer and D.S. Palermo, eds., *Cognition and the Symbolic Processes*, Vol. 2, Hillsdale, N.J.: Lawrence Erbaum Associates, Publishers, 287-293.

Heiner, Ronald A. 1983: "The Origin of Predictable Behavior," *American Economic Review* 73, 560-595.

Heiner, Ronald A. 1990: "Rule-Governed Behavior in Evolution and Human Society," *Constitutional Political Economy* 1 (quoted here from typescript).

Henrich, Joseph et al. 2005: "'Economic Man' in cross-cultural perspective: Behavioral experiments in 15 small-scale societies," *Behavioral and Brain Science* 28, 795-855.

Holland, John H. (1988) "The Global Economy as an Adaptive System," in: P.W. Anderson, K.J. Arrow and D. Pines, eds., *The Economy as an Evolving Complex System*, Vol. V, Santa Fe Institute Studies in the Sciences of Complexity, Redwood City, Cal. et al.: Addison-Wesley Publishing Company, Inc., 117-124.

Holland, John H. (1992a) *Adaptation in Natural and Artificial Systems*, Cambridge, Mass., and London: The MIT Press.

Holland, John H. (1992b) "Complex Adaptive Systems," *Daedalus – Journal of the American Academy of Arts and Sciences*, 121, 17-30.

Holland, John H. (1995) *Hidden Order: How Adaptation Builds Complexity, Reading*, Massachusetts: Helix Books.

Holland, John H. (1996) "The Rationality of Adaptive Agents," in K.J. Arrow, E. Colombatto, M. Perlman and Ch. Schmidt (eds.), *The Rational Foundations of Economic Behavior – Proceedings of the IEA Conference held in Turin*, Italy, New York: St. Martin's Press, 281-301.

Holland, J. H.; K.J. Holyoak; R.E. Nisbett and P.R. Thagard (1986) *Induction*, Cambridge, Mass.: MIT Press.

Loewenstein, George 2000: "Emotions in Economic Theory and Economic Behavior," *The American Economic Review* 90, Papers and Proceedings, 426-432.

Mäki, Uskali 1998: "As if," in: J. Davis, W. Hands and U. Mäki, eds., *The Handbook of Economic Methodology*, Cheltenham: Edward Elgar, 25-27.

Mäki, Uskali 2007: "Unrealistic assumptions and unnecessary confusions: Rereading and rewriting F53 as a realist statement," in: Uskali Mäki, ed., *The Methodology of Positive Economics: Milton Friedman's Essay Fifty Years After*, Cambridge: Cambridge University Press (quoted from typescript).

Mäki, Uskali, ed. 2007: *The Methodology of Positive Economics: Milton Friedman's Essay Fifty Years After*, Cambridge: Cambridge University Press.

Mayr, Ernst 1988: *Toward a New Philosophy of Biology – Observations of an Evolutionist*, Cambridge, Mass., and London: Harvard University Press.

Mayr, Ernst 1992: "The Idea of Teleology," *Journal of the History of Ideas*, 53, 117-135.

McClennen, Edward F. 2004: "The Rationality of Being Guided by Rules," in: Alfred R. Mele and Pies Rawling, eds., *The Oxford Handbook of Rationality*, New York: Oxford University Press, 222-239.

McFadden, Daniel 1999: "Rationality for Economists?" *Journal of Risk and Uncertainty* 19, 73-105.

McFadden, Daniel 2005: "The New Science of Pleasure – Consumer Behavior and the Measurement of Well-Being," Frisch Lecture, Econometric Society World Congress, London, August 20, 2005.

Mises, Ludwig von (1949) *Human Action – A Treatise in Economics*, New Haven: Yale University Press.

McFadden, Daniel 2005: "The New Science of Pleasure – Consumer Behavior and the Measurement of Well-Being," Frisch Lecture, Econometric Society World Congress, London, August 20, 2005.

Pettit, Philip 2005: "Construing Sen on Commitment," *Economics and Philosophy* 21, 15-32.

Popper, Karl R. 1972: *Objective Knowledge – An Evolutionary Approach*, Oxford: At the Clarendon Press.

Popper, Karl R. 1976: *Unended Quest – An Intellectual Biography*, La Salle, Ill.: Open Court.

Popper, Karl R. 1980: *The Logic of Scientific Discovery*, London and New York: Routledge.

Popper, Karl R. 1982: *The Open Universe – An Argument for Indeterminism*, London: Routledge.

Popper, Karl R. and John C. Eccles 1983: *The Self and Its Brain*, London and New York: Routledge.

Sen, Amartya K. 1977: "Rational Fools: A Critique of the Behavioral Foundations of Economic Theory," *Philosophy and Public Affairs* 6, 317-344.

Sen, Amartya 1973: "Behaviour and the Concept of Preference," *Economica, New Series*, 40, 241-259.

Sen, Amartya 2002: *Rationality and Freedom*, Cambridge, Mass., and London: The Belknap Press of Harvard University Press.

Sen, Amartya 2002a: "Introduction: Rationality and Freedom," in: A. Sen 2002, 3-64.

Sen, Amartya 2002b: "Maximization and the Act of Choice," in: A. Sen 2002, 158-205.

Sen, Amartya 2002c: "Goals, Commitments, and Identity," in: A. Sen 2002. 206-224.

Simon, Herbert A. 1982: "The Role of Expectations in an Adaptive or Behavioral Model," in: *Models of Bounded Rationality*, Vol. 2, *Behavioral Economics and Business Organization*, Cambridge, Mass., and London: The MIT Press, 380-399.

Simon, Herbert A. 1984: "On the Behavioral and Rational Foundations of Economic Dynamics," *Journal of Economic Behavior and Organization*, 5, 35-55.

Smith, Vernon L. 2003: "Constructivist and Ecological Rationality in Economics," *The American Economic Review* 93, 465-508.

Vanberg, Viktor J. 1994: *Rules and Choice in Economics*, London and New York: Routledge.

Vanberg, Viktor J. 2002: "Rational Choice vs. Program-Based Behavior: Alternative Theoretical Approaches and their Relevance for the Study of Institutions," *Rationality and Society* 14, 7-53.

Vanberg, Viktor J. 2004a: “The Rationality Postulate in Economics: Its Ambiguity, its Deficiency and its Evolutionary Alternative,” *Journal of Economic Methodology* 11, 1-29.

Vanberg, Viktor 2004b: “Austrian Economics, Evolutionary Psychology and Methodological Dualism: Subjectivism Reconsidered,” *Advances in Austrian Economics*. 7, 155-199 (Volume on *Evolutionary Psychology and Economic Theory* ed. by Roger Koppl).

Vanberg, Viktor J. 2006: Rationality, Rule-Following and Emotions:
On the Economics of Moral Preferences, Paper prepared for presentation at the workshop on “Naturalistic Perspectives on Economic Behavior – Are There Any Normative Correlates?” Max Planck Institute of Economics, Jena, Germany, October 12-14, 2006.

Veblen, Thorsten 1993 [orig. 1898]: “Why Is Economics Not an Evolutionary Science?” in: R. Tilman, ed., *A Veblen Treasury – From Leisure Class to War, Peace, and Capitalism*, Armonk (NY): Sharpe, 129-143.

Vromen, Jack 2004: “Routines, genes and program-based behaviour,” *Papers on Economics and Evolution*, Max Planck Institute of Economics, Jena, Germany.

Walras, Léon 1954 [orig. 1874]: *Elements of Pure Economics – Or the Theory of Social Wealth*, Homewood (IL): Richard D. Irwin Inc.

Winden, Franz van 2001: “Emotional Hazard, exemplified by taxation-induced anger,” *Kyklos* 54, 491-506.

Freiburger **Diskussionspapiere** zur Ordnungsökonomik

Freiburg **Discussion Papers** on Constitutional Economics

07/6 **Vanberg, Viktor J.:** Rational Choice, Preferences over Actions and Rule-Following Behavior

07/5 **Vanberg, Viktor J.:** Privatrechtsgesellschaft und ökonomische Theorie

07/4 **Goldschmidt, Nils / Rauchenschwandtner, Hermann:** The Philosophy of Social Market Economy: Michel Foucault's Analysis of Ordoliberalism.

07/3 **Fuest, Clemens:** Sind unsere sozialen Sicherungssysteme generationengerecht?

07/2 **Pelikan, Pavel:** Public Choice with Unequally Rational Individuals.

07/1 **Voßwinkel, Jan:** Die (Un-)Ordnung des deutschen Föderalismus. Überlegungen zu einer konstitutionenökonomischen Analyse.

06/10 **Schmidt, André:** Wie ökonomisch ist der „more economic approach"? Einige kritische Anmerkungen aus ordnungsökonomischer Sicht.

06/9 **Vanberg, Viktor J.:** Individual Liberty and Political Institutions: On the Complementarity of Liberalism and Democracy.

06/8 **Goldschmidt, Nils:** Ein „sozial temperierter Kapitalismus"? – Götz Briefs und die Begründung einer sozialethisch fundierten Theorie von Markt und Gesellschaft. Veröffentlicht in: Freiburger Universitätsblätter 42, Heft 173, 2006, S. 59-77.

06/7 **Wohlgemuth, Michael / Brandi, Clara:** Strategies of Flexible Integration and Enlargement of the European Union. A Club-theoretical and Constitutional Economics Perspective.

06/6 **Vanberg, Viktor J.:** Corporate Social Responsibility and the "Game of Catallaxy": The Perspective of Constitutional Economics.

06/5 **Pelikan, Pavel:** Markets vs. Government when Rationality is Unequally Bounded: Some Consequences of Cognitive Inequalities for Theory and Policy.

06/4 **Goldschmidt, Nils:** Kann oder soll es Sektoren geben, die dem Markt entzogen werden und gibt es in dieser Frage einen (unüberbrückbaren) Hiatus zwischen ‚sozialethischer' und ‚ökonomischer' Perspektive? Veröffentlicht in: D. Aufderheide, M. Dabrowski (Hrsg.): Markt und Wettbewerb in der Sozialwirtschaft. Wirtschaftsethische Perspektiven für den Pflegesektor, Berlin: Duncker & Humblot 2007, S. 53-81.

06/3 **Marx, Reinhard:** Wirtschaftsliberalismus und Katholische Soziallehre.

06/2 **Vanberg, Viktor J.:** Democracy, Citizen Sovereignty and Constitutional Economics.

06/1 **Wohlgemuth, Michael:** Demokratie und Marktwirtschaft als Bedingungen für sozialen Fortschritt. Veröffentlicht in: R. Clapham, G. Schwarz (Hrsg.): Die Fortschrittsidee und die Marktwirtschaft, Zürich: Verlag Neue Zürcher Zeitung 2006, S. 131-162.

05/13 **Kersting, Wolfgang:** Der liberale Liberalismus. Notwendige Abgrenzungen. In erweiterter Fassung veröffentlicht als: Beiträge zur Ordnungstheorie und Ordnungspolitik Nr. 173, Tübingen: Mohr Siebeck 2006.

05/12 **Vanberg, Viktor J.:** Der Markt als kreativer Prozess: Die Ökonomik ist keine zweite Physik. Veröffentlicht in: G. Abel (Hrsg.): Kreativität. XX. Deutscher Kongress für Philosophie. Kolloquiumsbeiträge, Hamburg: Meiner 2006, S. 1101-1128.

05/11 **Vanberg, Viktor J.:** Marktwirtschaft und Gerechtigkeit. Zu F.A. Hayeks Kritik am Konzept der „sozialen Gerechtigkeit". Veröffentlicht in: Jahrbuch Normative und institutionelle Grundfragen der Ökonomik, Bd. 5: „Soziale Sicherung in Marktgesellschaften", hrsg. von M. Held, G. Kubon-Gilke, R. Sturn, Marburg: Metropolis 2006, S. 39-69.

05/10 **Goldschmidt, Nils:** Ist Gier gut? Ökonomisches Selbstinteresse zwischen Maßlosigkeit und Bescheidenheit. Veröffentlicht in: U. Mummert, F.L. Sell (Hrsg.): Emotionen, Markt und Moral, Münster: Lit 2005, S. 289-313.

05/9 **Wohlgemuth, Michael:** Politik und Emotionen: Emotionale Politikgrundlagen und Politiken indirekter Emotionssteuerung. Veröffentlicht in: U. Mummert, F.L. Sell (Hrsg.): Emotionen, Markt und Moral, Münster: Lit 2005, S. 359-392.

05/8 **Müller, Klaus-Peter / Weber, Manfred:** Versagt die soziale Marktwirtschaft? – Deutsche Irrtümer.

05/7 **Borella, Sara:** Political reform from a constitutional economics perspective: a hurdle-race. The case of migration politics in Germany.

05/6 **Körner, Heiko:** Walter Eucken – Karl Schiller: Unterschiedliche Wege zur Ordnungspolitik.

05/5 **Vanberg, Viktor J.:** Das Paradoxon der Marktwirtschaft: Die Verfassung des Marktes und das Problem der „sozialen Sicherheit". Veröffentlicht in: H. Leipold, D. Wentzel (Hrsg.): Ordnungsökonomik als aktuelle Herausforderung, Stuttgart: Lucius & Lucius 2005, S. 51-67.

05/4 **Weizsäcker, C. Christian von:** Hayek und Keynes: Eine Synthese. In veränderter Fassung veröffentlicht in: ORDO, Bd. 56, 2005, S. 95-111.

05/3 **Zweynert, Joachim / Goldschmidt, Nils:** The Two Transitions in Central and Eastern Europe and the Relation between Path Dependent and Politically Implemented Institutional Change. In veränderter Fassung veröffentlicht in: Journal of Economic Issues, Vol. 40, 2006, S. 895-918.

05/2 **Vanberg, Viktor J.:** Auch Staaten tut Wettbewerb gut: Eine Replik auf Paul Kirchhof. Veröffentlicht in: ORDO, Bd. 56, 2005, S. 47-53.

05/1 **Eith, Ulrich / Goldschmidt, Nils:** Zwischen Zustimmungsfähigkeit und tatsächlicher Zustimmung: Kriterien für Reformpolitik aus ordnungsökonomischer und politikwissenschaftlicher Perspektive. Veröffentlicht in: D. Haubner, E. Mezger, H. Schwengel (Hrsg.): Agendasetting und Reformpolitik. Strategische Kommunikation zwischen verschiedenen Welten, Marburg: Metropolis 2005, S. 51-70.

04/15 **Zintl, Reinhard:** Zur Reform des Verbändestaates. Veröffentlicht in: M. Wohlgemuth (Hrsg.): Spielregeln für eine bessere Politik. Reformblockaden überwinden – Leistungswettbewerb fördern, Freiburg, Basel, Wien 2005, S. 183-201.

04/14 **Blankart, Charles B.:** Reform des föderalen Systems. Veröffentlicht in: M. Wohlgemuth (Hrsg.): Spielregeln für eine bessere Politik. Reformblockaden überwinden – Leistungswettbewerb fördern, Freiburg, Basel, Wien 2005, S. 135-158.

04/13 **Arnim, Hans Herbert von:** Reformen des deutschen Parteiensystems. Veröffentlicht in: M. Wohlgemuth (Hrsg.): Spielregeln für eine bessere Politik. Reformblockaden überwinden – Leistungswettbewerb fördern, Freiburg, Basel, Wien 2005, S. 87-117.

04/12 **Goldschmidt, Nils:** Alfred Müller-Armack and Ludwig Erhard: Social Market Liberalism.

04/11 **Vanberg, Viktor J.:** The Freiburg School: Walter Eucken and Ordoliberalism.

04/10 **Vanberg, Viktor J.:** Market and State: The Perspective of Constitutional Political Economy. Veröffentlicht in: Journal of Institutional Economics, Vol. 1 (1), 2005, p. 23-49.

04/9 **Goldschmidt, Nils / Klinckowstroem, Wendula Gräfin v.:** Elisabeth Liefmann-Keil. Eine frühe Ordoliberale in dunkler Zeit. Veröffentlicht in: N. Goldschmidt (Hrsg.): Wirtschaft, Politik und Freiheit. Freiburger Wirtschaftswissenschaftler und der Widerstand, Tübingen: Mohr Siebeck 2005, S. 177-204.

04/8 **Albert, Hans:** Wirtschaft, Politik und Freiheit. Das Freiburger Erbe. Veröffentlicht in: N. Goldschmidt (Hrsg.), Wirtschaft, Politik und Freiheit. Freiburger Wirtschaftswissenschaftler und der Widerstand, Tübingen: Mohr Siebeck 2005, S. 405-419.

04/7 **Wohlgemuth, Michael / Sideras, Jörn:** Globalisability of Universalisability? How to apply the Generality Principle and Constitutionalism internationally.

04/6 **Vanberg, Viktor J.:** Sozialstaatsreform und ‚soziale Gerechtigkeit'. Veröffentlicht in: Politische Vierteljahresschrift, Jg. 45, 2004, S. 173-180.

04/5 **Frey, Bruno S.:** Direct Democracy for a Living Constitution. In deutscher Übersetzung veröffentlicht in: M. Wohlgemuth (Hrsg.): Spielregeln für eine bessere Politik. Reformblockaden überwinden – Leistungswettbewerb fördern, Freiburg, Basel, Wien 2005, S. 26-86.

04/4 **Commun, Patricia:** Erhards Bekehrung zum Ordoliberalismus: Die grundlegende Bedeutung des wirtschaftspolitischen Diskurses in Umbruchszeiten.

04/3 **Vanberg, Viktor J.:** Austrian Economics, Evolutionary Psychology and Methodological Dualism: Subjectivism Reconsidered. Veröffentlicht in: R. Koppl (ed.): Evolutionary Psychology and Economic Theory (Advances in Austrian Economics, Vol. 7), Amsterdam et al.: Elsevier 2004, p. 155-199.

04/2 **Vaubel, Roland:** Reformen der europäischen Politikverflechtung. Veröffentlicht in: M. Wohlgemuth (Hrsg.): Spielregeln für eine bessere Politik. Reformblockaden überwinden – Leistungswettbewerb fördern, Freiburg, Basel, Wien 2005, S. 118-134.

04/1 **Wohlgemuth, Michael:** The Communicative Character of Capitalistic Competition. A Hayekian response to the Habermasian challenge. Veröffentlicht in: The Independent Review, Vol. 10 (1), 2005, p. 83-115.

03/10 **Goldschmidt, Nils:** Zur Theorie der Sozialpolitik. Implikationen aus ordnungsökonomischer Perspektive. Veröffentlicht in: N. Goldschmidt, M. Wohlgemuth (Hrsg.): Die Zukunft der Sozialen Marktwirtschaft. Sozialethische und ordnungsökonomische Grundlagen, Tübingen: Mohr Siebeck 2004, S. 63-95.

03/9 **Buchanan, James M:** Same Players, Different Game: How Better Rules Make Better Politics. In deutscher Übersetzung veröffentlicht in: M. Wohlgemuth (Hrsg.): Spielregeln für eine bessere Politik. Reformblockaden überwinden – Leistungswettbewerb fördern, Freiburg, Basel, Wien 2005, S. 25-35.

03/8 **Dathe, Uwe / Goldschmidt, Nils:** Wie der Vater, so der Sohn? Neuere Erkenntnisse zu Walter Euckens Leben und Werk anhand des Nachlasses von Rudolf Eucken in Jena. Veröffentlicht in: ORDO, Bd. 54, 2003, S. 49-74.

03/7 **Vanberg, Viktor J.:** The Status Quo in Contractarian Constitutionalist Perspective. Veröffentlicht in: Constitutional Political Economy, Vol. 15, 2004, p. 153-170.

03/6 **Vanberg, Viktor J.:** Bürgersouveränität und wettbewerblicher Föderalismus: Das Beispiel der EU. Veröffentlicht in: W. Schäfer (Hrsg.): Zukunftsprobleme der europäischen Wirtschaftsverfassung, Berlin: Duncker & Humblot 2004, S. 51-86.

03/5 **Pelikan, Pavel:** Bringing Institutions into Evolutionary Economics: Another View with Links to Changes in Physical and Social Technologies. Veröffentlicht in: Journal of Evolutionary Economics, Vol. 13, 2003, p. 237-258.

03/4 **Nau, Heino Heinrich:** Reziprozität, Eliminierung oder Fixierung? Kulturkonzepte in den Wirtschaftswissenschaften im Wandel. Veröffentlicht in: G. Blümle u.a. (Hrsg.): Perspektiven einer kulturellen Ökonomik, Münster: Lit-Verlag 2004, S. 249-269.

03/3 **Vanberg, Viktor J.:** The Rationality Postulate in Economics: Its Ambiguity, its Deficiency and its Evolutionary Alternative. Veröffentlicht in: Journal of Economic Methodology, Vol. 11, 2004, p. 1-29.

03/2 **Goldschmidt, Nils / Berndt, Arnold:** Leonhard Miksch (1901–1950) – A Forgotten Member of the Freiburg School. Veröffentlicht in: American Journal of Economics and Sociology, Vol. 64, 2005, p. 973-998.

03/1 **Vanberg, Viktor J.:** Die Verfassung der Freiheit: Zum Verhältnis von Liberalismus und Demokratie. Veröffentlicht in: N. Berthold, E. Gundel (Hrsg.): Theorie der sozialen Ordnungspolitik, Stuttgart: Lucius & Lucius 2003, S. 35-51.

02/8 **Fischer, Christian:** Europäisierung der nationalen Zivilrechte – Renaissance des institutionellen Rechtsdenkens?

02/7 **Wohlgemuth, Michael:** Schumpeterian Political Economy and Downsian Public Choice: Alternative economic theories of democracy. Veröffentlicht in: A. Marciano, J.-M. Josselin (eds.): Law and the State. A Political Economy Approach, Cheltenham: Edward Elgar 2005, p. 21-57.

02/6 **Schnellenbach, Jan:** The Evolution of a Fiscal Constitution When Individuals are Theoretically Uncertain. Veröffentlicht in: European Journal of Law & Economics, Vol. 17, 2004, p. 97-115.

02/5 **Vanberg, Viktor J.:** Rationalitätsprinzip und Rationalitätshypothesen: Zum methodologischen Status der Theorie rationalen Handelns. Veröffentlicht in: H. Siegenthaler (Hrsg.): Rationalität im Prozess kultureller Evolution. Rationalitätsunterstellungen als eine Bedingung der Möglichkeit substantieller Rationalität des Handelns, Tübingen: Mohr Siebeck 2005, S. 33-63.

02/4 **Märkt, Jörg:** Zur Methodik der Verfassungsökonomik. Die Aufgabe eines vertragstheoretisch argumentierenden Ökonomen.

02/3 **Märkt, Jörg:** Armutsexternalitäten: Verfassungsökonomische Rechtfertigung einer kollektiven Grundsicherung. Veröffentlicht in: Analyse & Kritik 25, 2003, S. 80-100.

02/2 **Pelikan, Pavel:** Why Economic Policies Need Comprehensive Evolutionary Analysis. Veröffentlicht in: P. Pelikan, G. Wegner (eds.): The Evolutionary Analysis of Economic Policy, Cheltenham, Northampton: Elgar 2003, p. 15-45.

02/1 **Vanberg, Viktor J.:** F. A. Hayek und die Freiburger Schule. Veröffentlicht in: ORDO, Bd. 54, 2003, S. 3-20.

http://www.walter-eucken-institut.de/publikationen/diskussionspapiere.htm